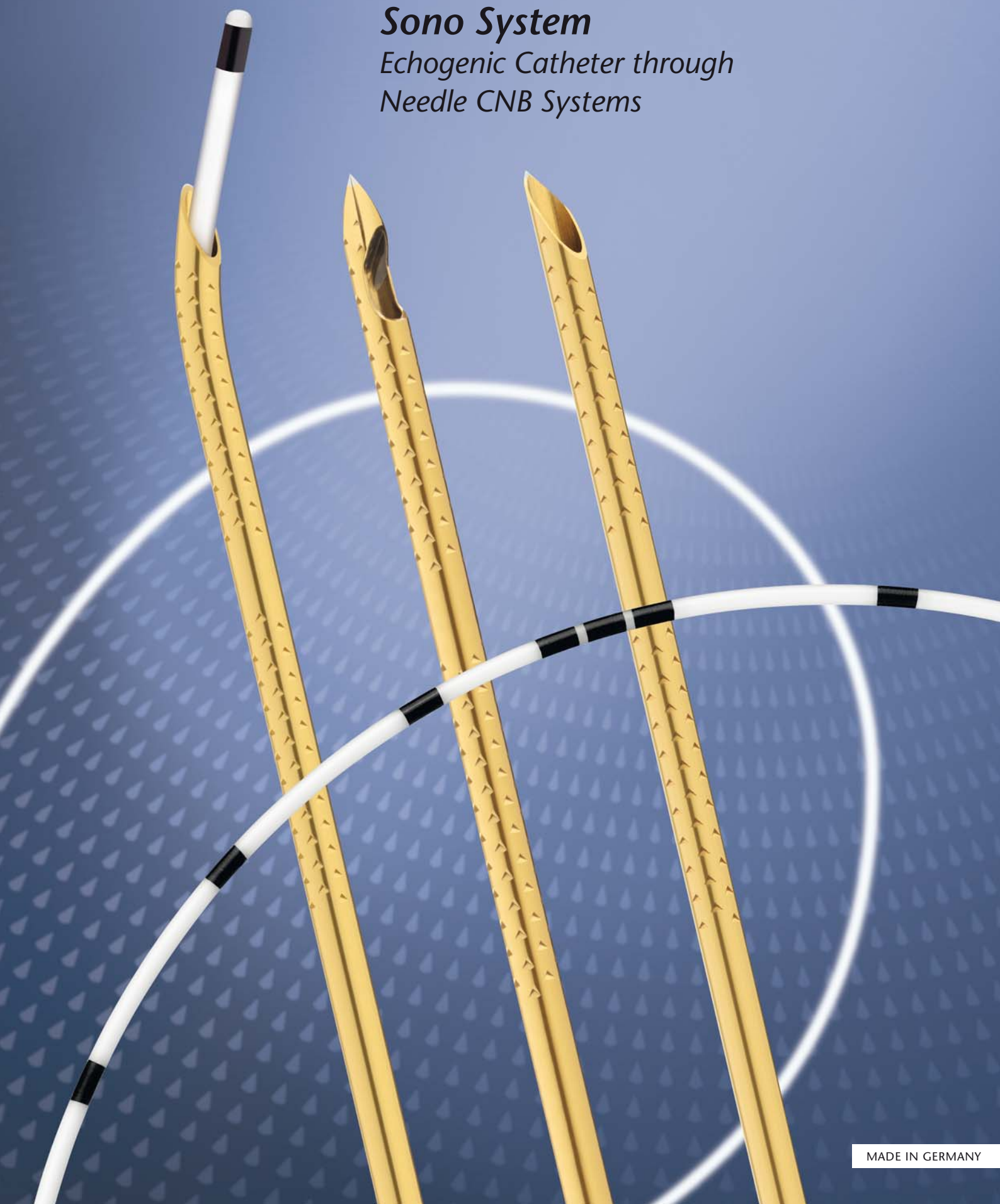
PAJUNK®

Sono System

Echogenic Catheter through Needle CNB Systems



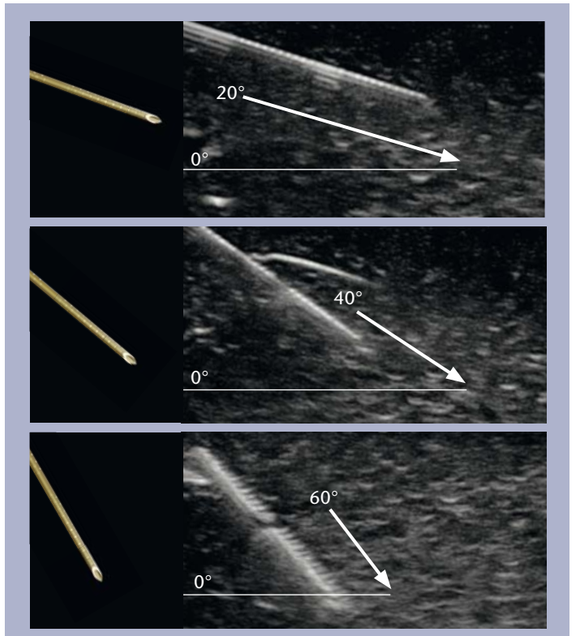
MADE IN GERMANY

Cornerstone Reflectors

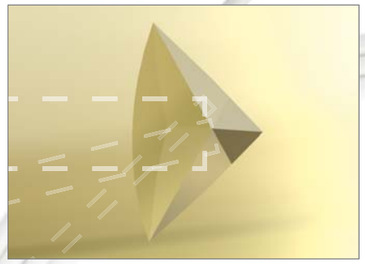
Sono needles with maximum echogenicity

The visibility of needle tips in ultrasound guided puncture is very important in preventing damage to neurons and blood vessels.[1] As even needles that are visible under ultrasound cannot always be identified at angles of 45° and above[2], this property has become a key decision-making criterion in the selection of needles in practice.[3]

The patented Cornerstone Technology developed by Pajunk together with Dr. Chris Mitchell was designed specifically to solve this problem, and produces excellent visibility irrespective of the insertion angle.[4] Sono needles have a high degree of precision even at steep insertion angles. Both, the needle shaft and -tip are very clearly visible.[5] In this way, Sono needles make an important contribution to the safety of the application.[6]



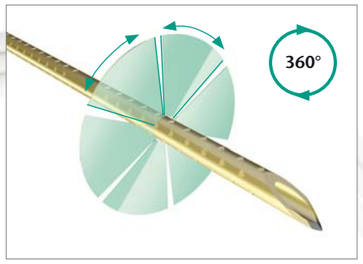
A test with various insertion angles, rising at 20° increments to 60°, confirms that Sono needles are highly visible irrespective of the insertion angle.



Echogenic Cornerstone Geometry

The embossed structures in the Cornerstone Reflectors form three surfaces which meet each other at a 90° angle.

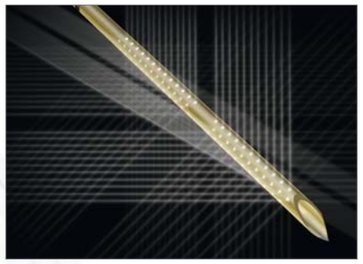
➡ This guarantees direct or indirect reflection of the ultrasound waves even at very steep insertion angles.[2]



Sophisticated 360° arrangement

Both needle segments are graduated all-around with evenly offset Cornerstone Reflectors. The number and layout of these reflectors is matched precisely to the relevant needle diameter.

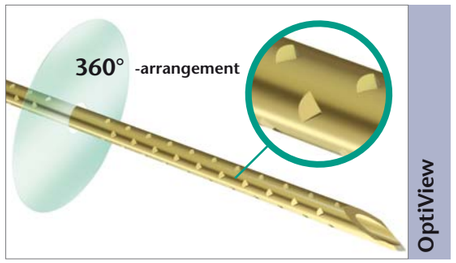
➡ Perfect needle identification is guaranteed in every position.



Visibility irrespective of the insertion angle

The Cornerstone Reflectors are designed that the ultrasound waves are very well reflected even with an insertion angle of 60° to 70°.[2]

➡ Ultrasound waves are reflected along a total length of 20 mm. Needle shaft and needle tip can be clearly identified.



- ➡ **Echogenic, three-dimensional Cornerstone Geometry**
- ➡ **360° configuration, arranged evenly around the needle shaft**
- ➡ **Aligned to the needle diameter**
- ➡ **Two 1 cm segments for positioning**
- ➡ **Cornerstone Reflectors are embossed as far as the tip of the needle**

= Optimum needle visibility from shaft to tip, irrespective of the insertion angle

- ➡ *Special configuration of the Cornerstone Reflectors for optimum 360° sonographic visibility*
- ➡ *Ultrasound waves are reflected along a length of 20 mm*
- ➡ *Clear identification of needle shaft and tip*
- ➡ *Reflexion especially at steep insertion angles*
- ➡ *360° length graduation for optimum positioning*

1 Wiesmann et al., Compound imaging technology and echogenic needle …, 2013; 38(5): 452–455
2 Uppal, Sondekoppam, Ganapathy, Effect of beam steering on …, 2014; 61(10): 909–915
3 Sviggum, Ahn, Dilger, Smith, Needle echogenicity in sonographically …, 2013; 32(1): 143–148
4 Hebard, Hocking, Echogenic technology can improve needle visibility …, 2011; 36(2): 185–189
5 Edgcombe, Hocking, Sonographic identification of needle tip …, 2010; 35(2): 207–211
6 Hocking, Mitchell, Optimizing the safety and practice …, 2012; 604

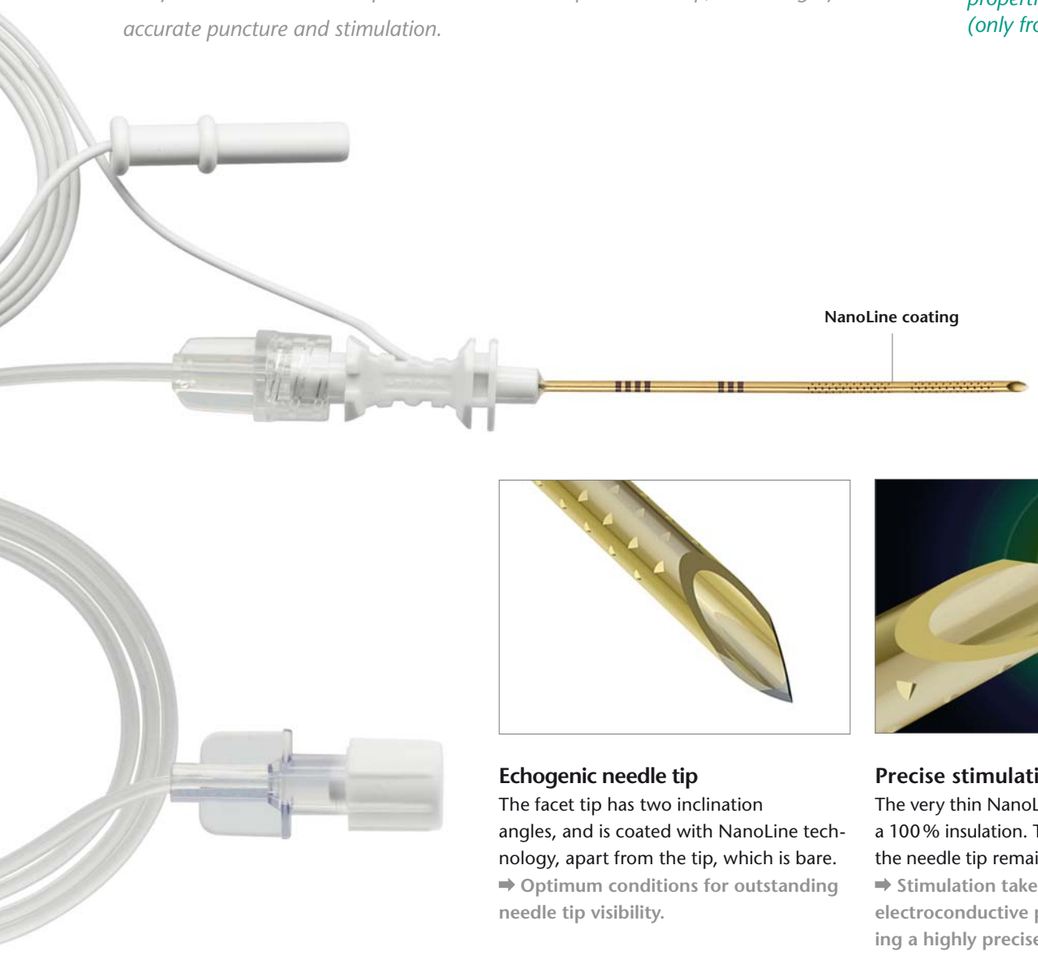
Dual Guidance

Precise nerve stimulation with NanoLine

The echogenic Cornerstone Needle is used to identify the relevant nerve under ultrasound, and in a second step the "Dual Guidance" procedure can be performed to check the accuracy of catheter placement by means of nerve stimulation. To this end, the distance from the nerve is deduced from the lowest current strength required for stimulation. The NanoLine NanoLine thin layer technology developed by Pajunk offers considerable benefits with regard to accuracy of stimulation, because it allows the insulating layer to be reduced to a minimum without affecting the functionality. This extremely thin polymer layer, which is applied to every internal and external part of the device except the bare tip, allows highly accurate puncture and stimulation.

- ➡ *Combination of ultrasound and stimulation technique*
- ➡ *Optimisation of puncture accuracy*
- ➡ *Better safety in use*
- ➡ *Nerve stimulator MultiStim ECO, designed specially for combination procedures*
- ➡ *Accurate stimulation and excellent gliding properties with NanoLine (only from Pajunk)*

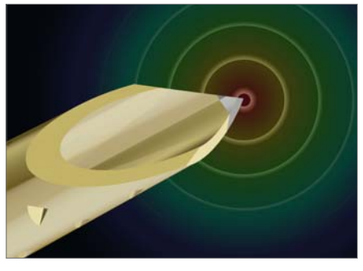
MultiStim ECO is a compact nerve stimulator developed by Pajunk, an easy-to-use device that meets the demands of combinated procedures.



Echogenic needle tip

The facet tip has two inclination angles, and is coated with NanoLine technology, apart from the tip, which is bare.

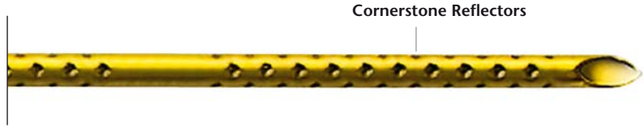
➡ **Optimum conditions for outstanding needle tip visibility.**

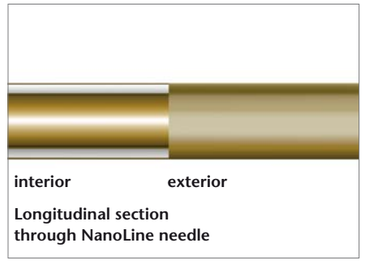


Precise stimulation

The very thin NanoLine coating guarantees a 100 % insulation. The contact point at the needle tip remains bare.

➡ **Stimulation takes place only via the electroconductive puncture tip, generating a highly precise electrical field.**



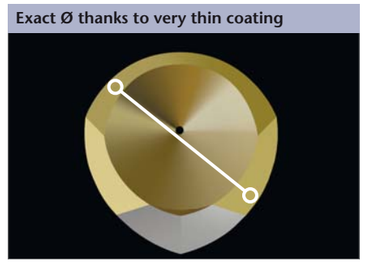


Longitudinal section through NanoLine needle

Coated inner lumen

The thin-coating technology used, means that even the inner lumina of needles can be coated.

➡ **This smooths out any unevenness and allows better flow of the anaesthetic.**



Reduced puncture force – increased glide properties

The very thin coating means that the exterior diameter is no different from when conventional coating techniques are used. It also produces an extreme surface smoothness.

➡ **NanoLine needles glide easily through tissue and do not require great puncture force.**

The advantages of NanoLine:

- ➡ *Layer thickness is reduced to a minimum*
- ➡ *There is no change to the external diameter of the needle*
- ➡ *The same excellent insulation properties as with conventional procedures*
- ➡ *A smooth surface to reduce the puncture force*
- ➡ *Extremely accurate stimulation via the contact point at the tip of the needle*

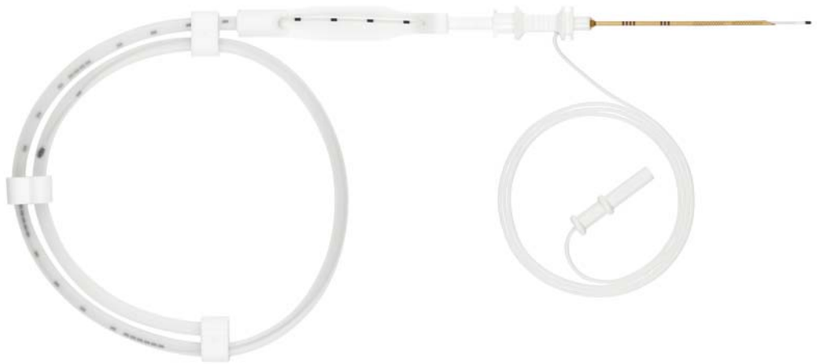
Set options

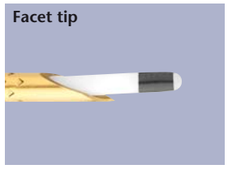
Ultrasound guided continuous nerve blocks

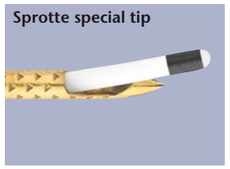
Together with Dr Meier, Pajunk developed the first sterile catheter placement technique. The catheter is enclosed in a sterile dispenser and can be directly threaded into the needle. This patented technique has established itself successfully on the market and has aroused a great response and recognition in the professional world. Pajunk differentiates between four Sono System sets depending on the catheter properties:

SonoLong Echo for convincing sonographic visibility

Set includes:
SonoLong Echo catheter + SonoLong NanoLine needle optional with three different tip designs

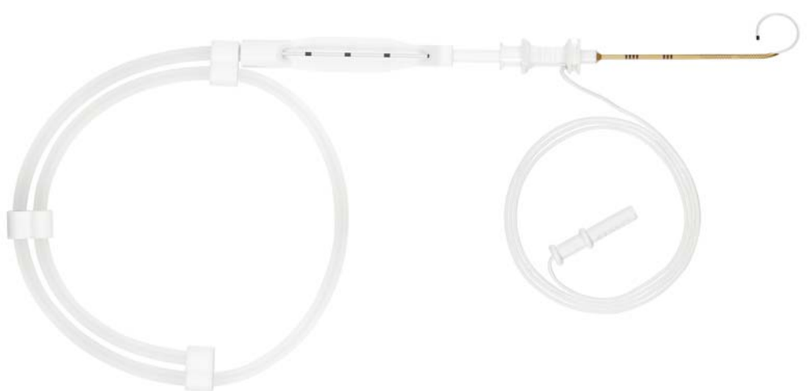


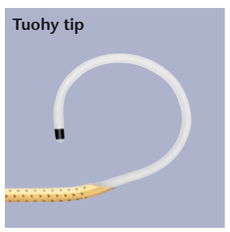




SonoLong Curl Echo for precise catheter placement

Set includes:
SonoLong Curl Echo catheter with coiled tip + SonoLong NanoLine needle with Tuohy tip

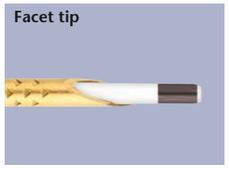




You also have a choice between up to three different needle types depending on the set variant. While the facet tip needle exclusively places the catheter parallel to the nerve, the Sprotte special needle and the Tuohy needle are suitable for those cases, where it is necessary to introduce the catheter at an angle to the nerve.

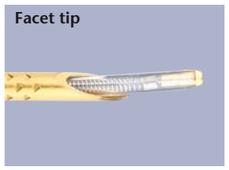
SonoLong Sono for maximum kink resistance

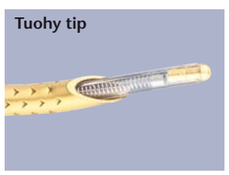
Set includes:
SonoLong Sono catheter with integrated stainless steel helical coil + SonoLong NanoLine needle optional with three different tip designs



StimuLong Sono II for additional nerve stimulation

Set includes:
StimuLong Sono catheter with stimulateable tip + SonoLong NanoLine needle with facet tip or Tuohy tip





SonoLong Echo

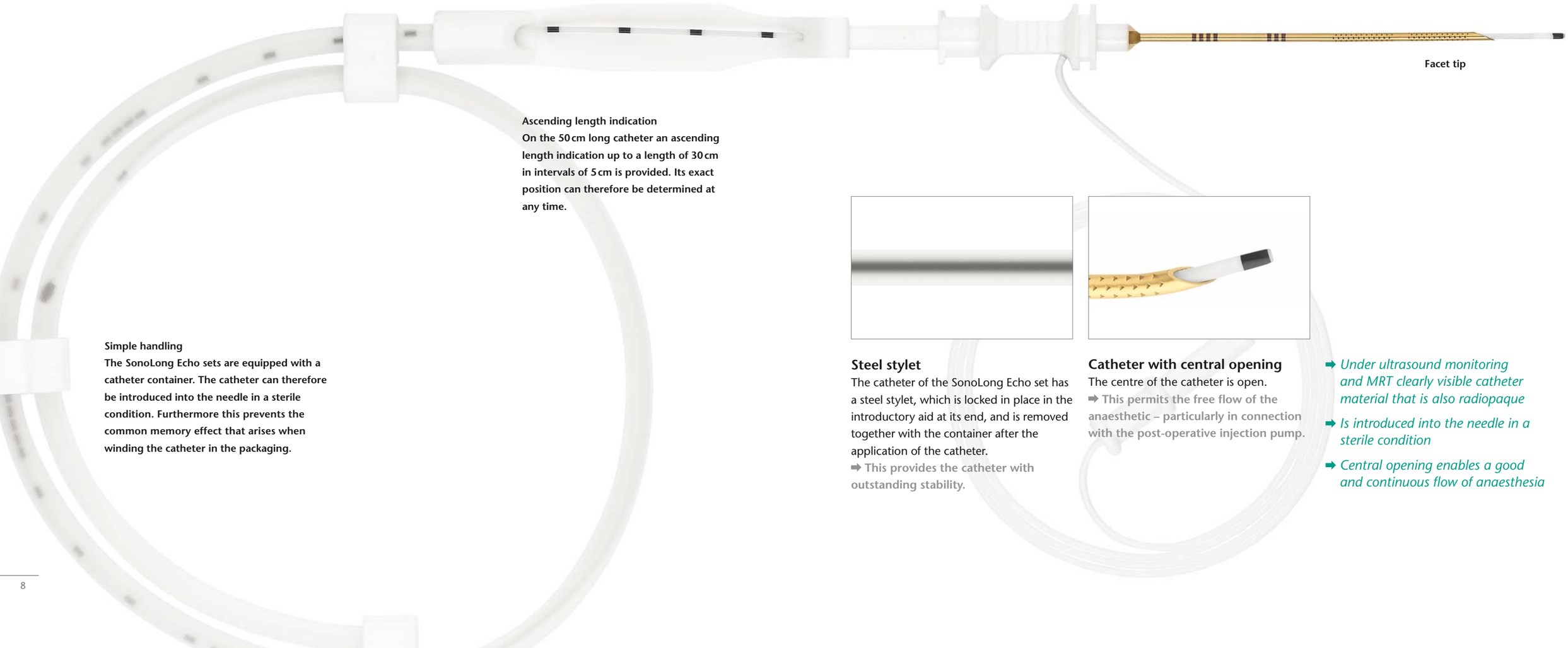
Catheter placement directly through the needle

The ultrasound procedure has radically changed processes in continuous regional anaesthesia. This has resulted in new requirements for the visibility of needles and catheters as well as their handling that our development department has been intensively working on for some time. Since Pajunk set a milestone in the industry in terms of the sonographic visibility of needles with Cornerstone Technology, we are pleased that with SonoLong Echo we succeeded in developing an ultrasound visible, MRT visible and radiopaque catheter.

Set includes:

- *SonoLong NanoLine needle with Cornerstone Reflectors optionally available with Sprotte special tip, Tuohy tip or facet tip*
- *SonoLong Echo catheter with catheter container*
- *FixoLong Mini system*
- *Colour coded adapter*

The special catheter material is extremely visible under ultrasound monitoring and in MRT and also radiopaque. – The best requirements for clear identification in all three procedures.



Facet tip

Ascending length indication
On the 50 cm long catheter an ascending length indication up to a length of 30 cm in intervals of 5 cm is provided. Its exact position can therefore be determined at any time.

Simple handling
The SonoLong Echo sets are equipped with a catheter container. The catheter can therefore be introduced into the needle in a sterile condition. Furthermore this prevents the common memory effect that arises when winding the catheter in the packaging.

Steel stylet

The catheter of the SonoLong Echo set has a steel stylet, which is locked in place in the introductory aid at its end, and is removed together with the container after the application of the catheter.
➡ This provides the catheter with outstanding stability.

Catheter with central opening

The centre of the catheter is open.
➡ This permits the free flow of the anaesthetic – particularly in connection with the post-operative injection pump.

- *Under ultrasound monitoring and MRT clearly visible catheter material that is also radiopaque*
- *Is introduced into the needle in a sterile condition*
- *Central opening enables a good and continuous flow of anaesthesia*

SonoLong Curl Echo

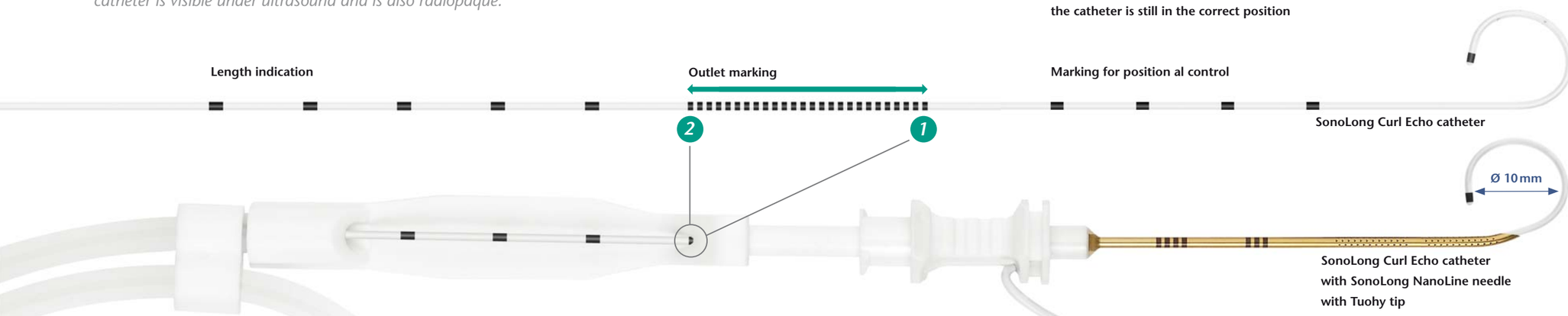
The "on-the-dot" anaesthesia, with a minimum of medication required

The provision of Cornerstone Reflectors eases precise positioning of the SonoLong NanoLine needle in the direct proximity of the nerve under ultrasound monitoring. Since the catheter will follow the path with the least resistance, and this does not always coincide with the neural structures, it is also necessary to monitor the position of the catheter exactly. Against this background, the SonoLong Curl Echo set was developed by Pajunk together with Dr. Cedric Luyet, which has a catheter that has been designed in a very special manner. The SonoLong Curl Echo catheter enables precise catheter positioning for a minimum of required medication. As soon as the catheter passes through the opening of the needle, the soft tip of the Curl catheter tip will roll up and therefore access the point where the needle tip is positioned. This permits an extremely precise anaesthesia, with a minimum of medication required. The SonoLong Curl Echo catheter is visible under ultrasound and is also radiopaque.

Set includes:

- ➡ *SonoLong NanoLine needle with Cornerstone Reflectors and Tuohy tip*
- ➡ *SonoLong Curl Echo catheter in the catheter container*
- ➡ *FixoLong Mini system*
- ➡ *Colour coded adapter*

The radiopaque SonoLong Curl Echo catheter is extremely visible under ultrasound. It has a curled end, a closed tip and six lateral openings. It can therefore be positioned extremely precisely and also provides an even distribution of anaesthetic.



For position control after catheter placement the catheter has been equipped with a 10 mm marking. Therefore it can be read off, whether the catheter is still in the correct position

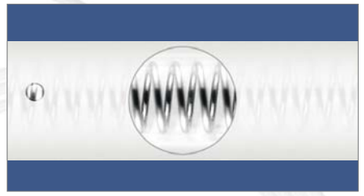
Exact catheter positioning
The SonoLong Curl Echo catheter curls in the direct proximity of the nerve. This permits a very precise administration of local anesthetic at the intended location.

SonoLong Curl Echo catheter with SonoLong NanoLine needle with Tuohy tip

Outlet marking

The SonoLong Curl Echo is pushed out of the needle tip

The soft Curl catheter tip is completely curled



Integrated stainless steel helical coil
The stainless steel helical coil confers kinking resistancy to the catheter.
➡ **This enables the unhindered flow of the anaesthetic, also and particularly over a longer period of time.**

- ➡ *Curled tip enables precise placement*
- ➡ *Six lateral eyes allow an even distribution of the anaesthesia*
- ➡ *Integrated stainless steel helical coil for maximum buckle protection and unhindered flow*
- ➡ *Needle and catheter are extremely visible under ultrasound*

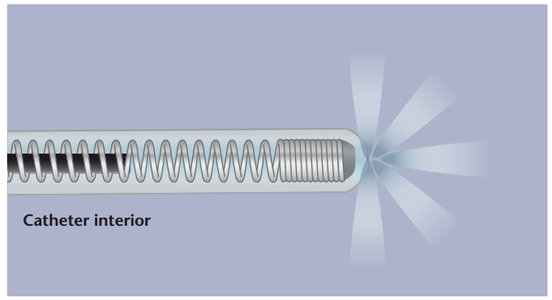
SonoLong Sono

The kink resistant catheter with stainless steel helical coil

The SonoLong Sono set is a joint development of Pajunk and Dr Meier. It differs from the SonoLong NanoLine set only in catheter design. It is equipped with an integrated stainless steel helical coil, and is suitable for long-term treatment in pain therapy and plexus anaesthesia. The SonoLong Sono set is, just as the SonoLong Echo set, available with three different types of needles: with a Sprotte special tip, needle with facet tip or with a Tuohy tip. All three needle variants are equipped with the proven Cornerstone Reflectors for improved visibility under ultrasound monitoring. The catheter material itself is characterized by its excellent echogenicity.

Set includes:

- *SonoLong NanoLine needle with Cornerstone Reflectors optionally available with Sprotte special tip, Tuohy tip or needle with facet tip*
- *SonoLong Sono catheter in catheter container*
- *FixoLong Mini system*
- *Colour coded adapter*



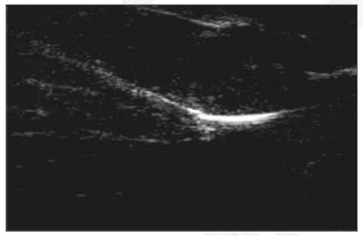
Catheter interior

Its integrated stainless steel helical coil provides the SonoLong Sono catheter with the highest degree of mobility and simultaneous kinking resistancy – an important aspect for continuous applications.

Sprotte special tip

Ascending length indication
On the 50 cm long catheter an ascending length indication up to a length of 30 cm in intervals of 5 cm is provided. Its exact position can therefore be determined at any time.

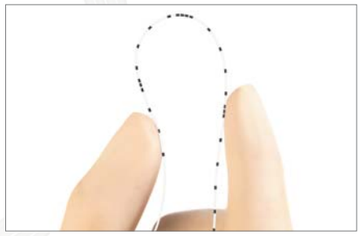
Simple handling
The SonoLong Sono sets are equipped with a catheter container. The catheter can therefore be introduced into the needle in a sterile condition. Furthermore this prevents the common memory effect that arises when winding the catheter in the packaging.



Visibility and orientation

The SonoLong Sono catheter is manufactured from echogenic material and graduated along the first 30 cm.

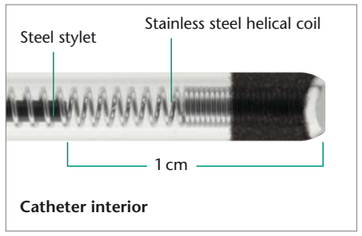
➡ This simplifies positioning and identification under ultrasound.



Unobstructed flow of the anaesthesia

The integrated stainless steel helical coil providesthe catheter with kinking resistancy.

➡ The best requirements for the unobstructed flow of anaesthesia for continuous applications and the safe connection of the catheter to the injection pump.



Catheter interior

Soft, flexible catheter tip

The steel stylet ends 1 cm before reaching the catheter tip, which leaves the tip soft and flexible.

➡ This raises the flexibility during the insertion of the catheter and reduces the risk of unintentional injuries of vessels.

- *Maximum mobility and kinking resistancy thanks to the stainless steel helical coil*
- *Soft, flexible catheter tip prevents unintentional injuries*
- *Needle and catheter are extremely visible under ultrasound monitoring*

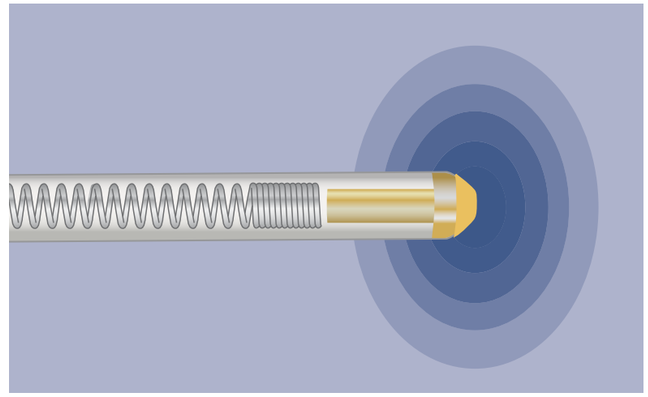
StimuLong Sono II

The combination of ultrasound and nerve stimulation provides double safety

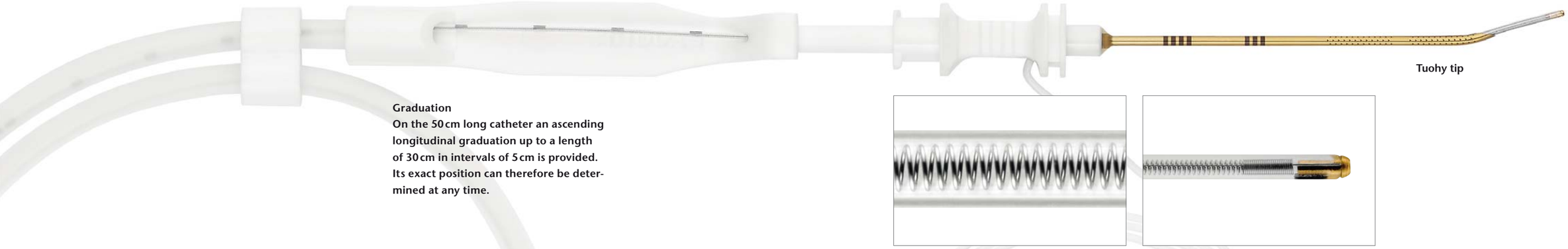
The StimuLong Sono II combines the advantages of a stimulateable catheter with those of echogenic Cornerstone Needles in one set. The StimuLongSono II catheter is characterised by its stimulateable tip. Stimulation is achieved here using an additional electric conductor that remains in the catheter over the entire application period and thus also enables subsequent position control. The relevant nerve is first identified by the echogenic Cornerstone Needle. In a second stage, the accuracy of the catheter placement can then be checked using nerve stimulation. The distance to the nerve can be derived at the minimum current strength that is required for stimulation. As the inner lumen is completely NanoLine coated when compared with conventional needles, comprehensive insulation can be assumed. Stimulation takes place exactly when the catheter tip comes out of the needle. A secondary position control of the catheter tip is also possible for intermittent post-operative pain therapy.

Set includes:

- *SonoLong NanoLine needle with Cornerstone Reflectors optionally available with Tuohy tip or needle with facet tip*
- *StimuLong Sono catheter in catheter container*
- *FixoLong Mini system*
- *Colour coded adapter*



The atraumatically rounded tip of the StimuLong Sono catheter is gold-plated. As a result, the highest possible conductivity and an excellent stimulation capability are guaranteed.



Graduation
On the 50 cm long catheter an ascending longitudinal graduation up to a length of 30 cm in intervals of 5 cm is provided. Its exact position can therefore be determined at any time.

Tuohy tip

Simple handling
The SonoLong Sono sets are equipped with a catheter container. The catheter can therefore be introduced into the needle in a sterile condition. Furthermore this prevents the common memory effect that arises when winding the catheter in the packaging.

Integrated stainless steel helical coil
The stainless steel helical coil provides the catheter with kinking resistancy.
➡ This ensures the unhindered flow of the anaesthetic, also and particularly over a longer period of time.

Stimulateable catheter
The catheter has a continuous electrical circuit.
➡ This establishes the electrical connection between the Clamping Adapter and stimulateable catheter tip.

- *Reliable flow of anaesthesia thanks to integrated stainless steel helical coil*
- *Stimulateable catheter ensures double safety during placement*
- *Excellent conductivity and stimulation capability due to gold-plated catheter tip*

Innovative catheter fixation

FixoLong Mini and FixoCath – ensure freedom of movement

Pajunk developed two different solutions for catheter fixation on patients; FixoLong Mini and FixoCath for catheter sizes 19 G and 20 G. Especially in continuous application, they prevent an accidental removal of the catheter if the patient moves or an obstruction of the anaesthetic flow by an unfavourable position.

FixoLong Mini

With FixoLong Mini, the catheter and MiniFilter are fixed close to the catheter exit, enabling greater freedom of movement in all continuous applications.

Art. No. 001151-43

FixoCath

FixoCath is simultaneously a transparent adhesive and fixation and is placed directly on the exit point. This also ensures significant freedom of movement for the patient.

Art. No. 001151-37Z

MiniFilter 0.2 µm

The 0.2 µm bacterial filter prevents the passage of bacteria.

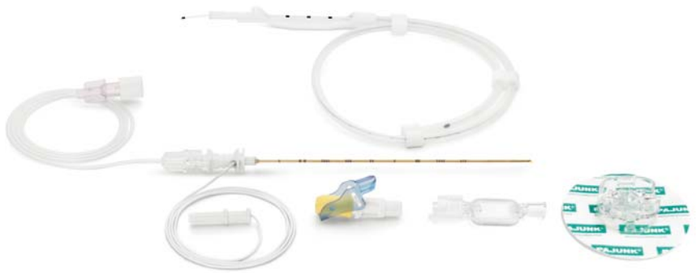
Art. No. 001151-38K

Clamping Adapter

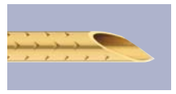
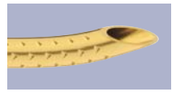
The Pajunk Clamping Adapter is a special anchoring device which prevents overstretching and ensures optimum anaesthetic flow.

Art. No. 001151-37V

SonoLong Echo

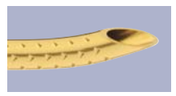


Set includes:
- SonoLong NanoLine needle with Luer Lock connector and electrical connecting cable
- Adaptable injection tube
- SonoLong Echo catheter 20 G x 50 cm with central opening and steel stylet
- Clamping Adapter (yellow)
- MiniFilter 0.2 µm
- FixoLong Mini

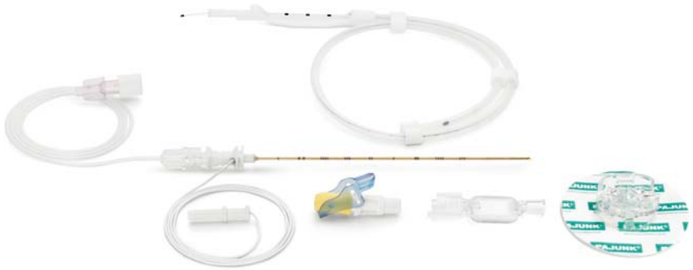
Product	Size	SonoLong Echo catheter	Item No.	PU
SonoLong NanoLine needle				
 Facet tip	19 G x 50 mm	20 G x 50 cm	531185-31A	10
	19 G x 75 mm	20 G x 50 cm	561185-31A	10
	19 G x 100 mm	20 G x 50 cm	521185-31A	10
	19 G x 150 mm	20 G x 50 cm	511185-31A	10
Sprotte special tip	19 G x 60 mm	20 G x 50 cm	531185-31B	10
	19 G x 120 mm	20 G x 50 cm	521185-31B	10
 Tuohy tip	18 G x 50 mm	20 G x 50 cm	531185-31C	10
	18 G x 75 mm	20 G x 50 cm	561185-31C	10
	18 G x 100 mm	20 G x 50 cm	521185-31C	10
	18 G x 150 mm	20 G x 50 cm	511185-31C	10

SonoLong Curl Echo

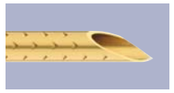
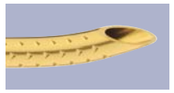
Set includes:
- SonoLong NanoLine needle with Luer Lock connector and electrical connecting cable
- Adaptable injection tube
- SonoLong Curl Echo catheter 20 G with integrated stainless steel helical coil, closed tip and 6 lateral openings
- Clamping Adapter (yellow)
- MiniFilter 0.2 µm
- FixoLong Mini

Product	Size	SonoLong Curl Echo catheter	Item No.	PU
SonoLong NanoLine needle				
 Tuohy tip	18 G x 50 mm	20 G x 50 cm	531188-31C	10
		20 G x 90 cm	531188-34C	10
	18 G x 100 mm	20 G x 90 cm	521188-34C	10

SonoLong Sono

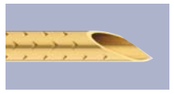


Set includes:
- SonoLong NanoLine needle with Luer Lock connector and electrical connecting cable
- Adaptable injection tube
- SonoLong Sono catheter 20 G with integrated stainless steel helical coil, steel stylet and central opening
- Clamping Adapter (yellow)
- MiniFilter 0.2 µm
- FixoLong Mini

Product	Size	SonoLong Sono catheter	Item No.	PU
SonoLong NanoLine needle				
 Facet tip	19 G x 50 mm	20 G x 50 cm	531187-31A	10
	19 G x 75 mm	20 G x 50 cm	561187-31A	10
	19 G x 100 mm	20 G x 50 cm	521187-31A	10
	19 G x 150 mm	20 G x 50 cm	511187-31A	10
Sprotte special tip	19 G x 60 mm	20 G x 50 cm	531187-31B	10
	19 G x 120 mm	20 G x 50 cm	521187-31B	10
 Tuohy tip	18 G x 50 mm	20 G x 50 cm	531187-31C	10
	18 G x 75 mm	20 G x 50 cm	561187-31C	10
	18 G x 100 mm	20 G x 50 cm	521187-31C	10
	18 G x 150 mm	20 G x 50 cm	511187-31C	10

StimuLong Sono II

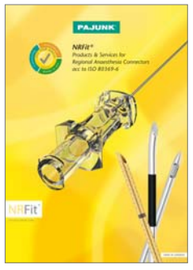
Set includes:
- SonoLong NanoLine needle with Luer Lock connector and electrical connecting cable
- Adaptable injection tube
- StimuLong Sono catheter 20 G x 50 cm with central opening, electrically conductive stylet and integrated metal helical coil
- StimuLong Clamping Adapter (yellow) with integrated stimulation connection
- Connecting cable
- MiniFilter 0.2 µm
- FixoLong Mini

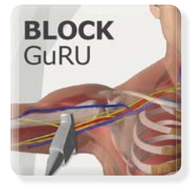
Product	Size	StimuLong catheter	Item No.	PU
SonoLong NanoLine needle				
 Facet tip	19 G x 50 mm	20 G x 50 cm	531187-32A	10
	19 G x 100 mm	20 G x 50 cm	521187-32A	10
Tuohy tip	18 G x 50 mm	20 G x 50 cm	531187-32C	10
	18 G x 100 mm	20 G x 50 cm	521187-32C	10

SonoCover

SonoCover

Product	Size	Item No.	with adhesive strips	with two elastic bands	with ultrasound gel	with 3D chamber	sterile
SonoCover	15 x 30 cm	021151-1530	•	•	•		•
SonoCover	15 x 60 cm	021151-1560	•	•	•		•
SonoCover	15 x 100 cm	021151-1501	•	•	•		•
SonoCover	15 x 30 cm	011151-1530	•	•		•	•
SonoCover	15 x 60 cm	011151-1560	•	•		•	•
SonoCover	15 x 100 cm	011151-1501	•	•		•	•
SonoCover	15 x 30 cm	031151-1530	•	•	•	•	•
SonoCover	15 x 60 cm	031151-1560	•	•	•	•	•
SonoCover	15 x 100 cm	031151-1501	•	•	•	•	•
SonoCover	15 x 30 cm	001151-1530	•	•			•
SonoCover	15 x 60 cm	001151-1560	•	•			•
SonoCover	15 x 100 cm	001151-1501	•	•			•





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